

Study program / course: Mechanical Engineering				
Type and level of study: Master academic studies				
Course: Fracture mechanics				
Lecturers: Nikolić R. Ružica, Živković M. Miroslav, Jovičić R. Gordana				
Status of course: Elective for module M2, III semester				
Number of ECTS: 6				
Prerequisite: None				
The course objective Introducing with the fracture mechanics and material fatigue theory. Acquiring the knowledge related to engineering skills for estimates of the working life of structures that contain cracks. Estimates of the remain strength and damages of structures by application of the numerical methods.				
The course outcome After passing the exam, students should be able to apply the acquired knowledge in the fracture mechanics and the fatigue mechanics to design of structures and to apply the various numerical methods for calculation and design of structures that contain cracks or other types of damages.				
Syllabus Theoretical study Introductory basic concepts and relations. Stress concentrations, stress intensity and stresses at the crack tip. Modes of crack propagation. Cracks in elastic-plastic materials. Energy balance, surface energy, energy release rate. Stress intensity factor. Rice integral and methods of its determination. Crack propagation due to cyclic loads, Paris's law. Analysis of the high-cycle fatigue. Load spectra. Low-cycle fatigue. Analysis of the structures' life under the action of the low-cycle fatigue. Estimates of the remain structures strength and structural damages by application of the numerical methods. Practical classes Problems solving, homeworks, tests and colloquia. (Same areas as for theoretical lecturing).				
Recommended reading 1. Sedmak, A., "Fracture Mechanics", Faculty of Mechanical Engineering, Belgrade, 2004. (In Serbian) 2. Čulafić, V., "Introduction to Fracture Mechanics", University of Montenegro, Podgorica, 2002. (In Serbian) 3. Jovičić, G., Živković, M., Nikolić, R., "Fracture Mechanics - Theoretical fundamentals and numerical methods ", Faculty of Mechanical Engineering, Kragujevac, 2008. Lecture notes. (In Serbian) 4. Šumarac, D. and Krajčinović,D., "Fracture Mechanics Fundamentals", Scientific Book, Belgrade, 1990. (In Serbian)				
The number of hours of active teaching:				Other classes: 1
Theory: 3	Practical classes: 1.4	Other forms of teaching: 0.6	Research study:	
Methods of teaching Lecturing, Practical work, consultations (group and individual)				
Evaluation of knowledge				
Pre-final exam obligations	Points	Final exam*	Points*	
Activities during the classes:	10	Final test	30	
Tests:	30			
Colloquium (a):	30			
* The final test is taken only by candidates that are not satisfied with their score on tests and colloquia. In that case, only the score on final test is counted for the final grade.				